tions of our theoretical investigations, that in each unit of time the Sun's mean longitude did increase some definite and assigned angle, or these breaks of continuity will destroy all existing tables and introduce apparent inequalities not due to gravitation.

Note on Professor Adams's paper in the Monthly Notices for December 1883. By E. J. Stone, M.A., F.R.S.

Professor Adams's argument respecting the small difference between Bessel's and Le Verrier's sidereal times at mean noon is sufficiently treated on pages 36 and 37. It is impossible to assume, as Professor Adams does, that the meridian can have two directions in space at the same instant of absolute time.

Professor Adams's argument, page 46, line 11, that "mean solar time is measured, not by the Sun's mean motion in longitude, as Mr. Stone's theory supposes, but by the motion of the Sun in hour angle," is one which I do not profess to understand. However the mean solar time is determined, the tabular motion in longitude must represent the true motion of the Sun in longitude, if the tables are to agree with observations. That I, therefore, do not allow an arbitrary change in the adopted values of the sidereal times at mean noon to change the tabular motion in longitude, whilst Prof. Adams confessedly allows such changes to be introduced, appears to prove that I am right and Prof. Adams is wrong.

On page 46 Professor Adams proves correctly enough that with my α_1 and α_2 he has—

$$\frac{T_1 - T_2}{T_2} = \frac{\alpha_1 - \alpha_2}{360^\circ + \alpha_2}, \quad \text{or} \quad = \frac{\delta n}{360^\circ + n}$$

with Professor Adams's notation, but it is impossible that both α_1 and α_2 or n and $n + \delta n$ can represent the real motion of the Sun in longitude in the units T_1 and T_2. (See page 34.) My result on this point is confirmed by Professor Cayley, who gets my result if the expression for the mean longitude of the sun is any continuous function. (See page 48.)

It is true that mean time can be determined from the time of the Sun's transit and the equation of time. The error in time thus determined will not, however, remove the errors of the tables in longitude. It merely expresses the time which the meridian and not the Sun takes in moving from the tabular position to the true position, and such corrections can therefore only remove the $\frac{1}{366}$th part of tabular errors due to arbitrary changes in the adopted R.A. of meridian at mean noons. Take for example:—

On 1881 September 16 the observed R.A. of the Sun on the Greenwich meridian, with error of sidereal clock found from stellar observations, was $11^h\ 40^m\ 33^s{\cdot}05$, whilst the tabular R.A.

was $11^h\ 40^m\ 33^s{\cdot}09$. The tabular longitude is therefore too large by $0''{\cdot}60$ according to this observation, when the clock errors are determined in the usual way. But if we determine the error of the sidereal clock, not from the stellar observations, but from the tabular R.A., which is the method mentioned by Professor Adams as that of the application of the equation of time, we shall find a sidereal time at noon larger by $0^s{\cdot}04$ than that found from the stellar observations. The difference of time thus found is, as Professor Adams remarks, very small; but the motion of the Sun in $0^s{\cdot}04$ is only about $0''{\cdot}00164$ in longitude; and this is the only effect produced by the change of time upon the tabular error of longitude, and is exactly the $\frac{1}{366}$th part of that required to remove the tabular error $0''{\cdot}60$.

Professor Cayley should certainly accept my results, for his conclusion is that I am right unless there are two mean Suns available (page 48, 7 lines from bottom); and Prof. Adams on page 44 distinctly states, "The only mean Sun known to astronomers is an imaginary body, which moves uniformly in the equator at such a rate that the difference between its Right Ascension and that of the true Sun consists wholly of periodic quantities." I agree that this is our present usage.

In conclusion, I merely call attention to the fact that in my work I use tabular days T_1 and T_2, such that Sun's true mean longitude $= A + n_1 t_1 = A + n_2 t_2$, where n_1 and n_2 are assigned angles, and T_1 T_2 are the corresponding adopted units. The advantage of this method is that we can correctly allow for the change of unit due to a change from n_1 to n_2 in the adopted value of the Sun's mean motion in longitude, for

$$\frac{T_1 - T_2}{T_2} = \frac{n_1 - n_2}{n_2}$$

is determinate. Attempts to measure motion in fallible units of the time used as our independent variable cannot but lead to error.

Remarks on Major-General Tennant's paper "On the Change in the adopted Unit of Time." By Prof. J. C. Adams, M.A., F.R.S.

The December number of the *Monthly Notices* contains a paper by Major-General Tennant in which the author arrives at conclusions which appear to him to confirm Mr. Stone's views respecting a change in the unit of mean solar time. In reality, however, those conclusions are quite consistent with my own as given in the same number of the *Monthly Notices*, and not at all with Mr. Stone's.

According to Major-General Tennant (*Monthly Notices*, p. 43), the factor by which the tabular mean motions should be multiplied in consequence of the change from Bessel's to Le Verrier's determination of the ratio of the mean solar to the sidereal day is what he calls